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Do boys differ from girls in navigating through hypertext environments when learning?

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Introduction

In today's education, hypertext learning environments (HLE) are widely used in order to enrich learning processes. However, as argued by DeStefano and LeFevre (2007), evidence strongly suggests that hypertext is not universally advantageous for learning compared to traditional linear presentations of text and that outcomes of hypertext-based learning depend to a large extent on learner characteristics together with the features of different types of hypertext.

One way of alleviating the problems such HLE's present, is varying the tools that aid hypertext navigation. In the digital era tag clouds are a viable new solution as a tool for navigational support besides the conventional hierarchical approach (a folder structure). Unfortunately, little research has been done to compare those two approaches. The studies of Civan, Jones, Klasnja and Bruce (2009) and Voit, Andrews and Slany (2012) are exceptions. Although both didn't find significant differences between using tags or hierarchies to refind information that participants themselves had previously stored in the structure, both found that the use of tags improved the subjective user experience. Differences in task performance to locate information in unknown tag cloud- or hierarchical navigation structures have not yet been investigated.

Besides, research shows that boys are more active in browsing than girls (Chen & Macredie, 2010). On the other hand, other studies found no evidence of gender differences in individuals' web search frequency (Hupfer & Detler, 2006). Furthermore, no conclusions are derived considering gender differences in task performance and the effect of navigational support and its interaction with gender differences on task performance.

The purpose of this study was to investigate the effects of navigational support (i.e., tag clouds and hierarchical menus) and gender as well as interaction effects between them on task performance and navigation behavior. The question to be answered is: Is there a difference between boys and girls when learning in a HLE based on a hierarchical or a tag-cloud navigation structure regarding task performance and navigation behavior?

Method

Participants

In total, 60 10th grade students (24 boys and 36 girls; mean age 15.63 years, SD = 0.69) participated. Students were randomly assigned to one of the two conditions (tagging or hierarchical, see Figures 1 and 2).

Material & Procedure

Students had to locate relevant information while searching in a hypertext environment with either hierarchical or tag cloud navigation. A fact-finding and a complex search task about the topic 'Obesity' were constructed. In the fact-finding task students had to find the percentage of obese people in the Netherlands. Answers were coded as correct or incorrect. In the complex search task students had to give three reasons why obesity is a bigger problem in the lower classes of society. The number of correct reasons was counted. Eye movements were recorded with a Tobii remote eye-tracker.

Both the tag-cloud and the hierarchical environment consisted of two types of web pages: overview pages (pages belonging to a tag or category with a list of text page titles, see Figures 1 and 2) and text pages (see Figures 3 and 4). Participants could access the text pages by clicking on the titles at the overview pages.

Data analysis

Task performance of the fact-finding task was analyzed with logistic regression, task performance of the complex task with linear regression.

Results

Although for the fact-finding task in the tagging condition the relative frequency of correct answers was higher than in the hierarchical condition, this effect was not significant. Neither gender nor type of navigational support significantly predicted task performance. Also no significant interaction was found between gender and type of navigational support on task performance. For the complex task, neither gender nor type of navigational support significantly predicted task performance, nor was there a significant interaction between gender and type of navigational support on task performance.

Discussion & Conclusions

The results of this study indicate that gender and type of navigational support do not influence task performance or time on task. Because there was no differences, it can be concluded that using tags as navigational support does not hamper performance as compared to more traditional navigation structures.

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